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LAB - 1

a) Develop a java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read a, b, c and use the quadratic formula. If the discriminate $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

```
import java.util.*;
class Quad {
Scanner sc = new Scanner (System.in);
int a, b, c, d;
double r1, r2, d_sq;

void input () {
System.out.println ("Enter coefficients a, b, c:");
a = sc.nextInt ();
b = sc.nextInt ();
c = sc.nextInt ();
}

Void calc () {
int d = b*b - 4*a*c;
System.out.println (d);
if (d==0) {
r1 = -b/(2.0*a);
System.out.println ("Roots are real and equal");
System.out.println ("Root 1 = "+r1+"\n Root 2 = "+r1);
}
```

```
else if (d>0) {
d_sq = Math.sqrt(d);
r1 = (-b + d_sq)/(2.0*a);
r2 = (-b + d_sq)/(2.0*a);          real and distinct
System.out.println("Roots are imaginary");
System.out.println("Root1 = "+r1+"\n Root2 = "+r2);
}
else {
d_sq = Math.sqrt(-d);
r1 = -b/(2.0*a);
r2 = d_sq/(2.0*a);
System.out.println("Roots are imaginary");
System.out.println("Root1 = "+r1+" + "+r2+"i" +
    "\n Root 2 = "+r1+" - "+r2+"i");
}}}
```

```
class Quadratic {
public static void main (String[] args) {
Quad quad = new Quad();
quad.input();
quad.calc();
}
}
```

Output

enter coefficients a, b, c

1

5

6

Roots are real and distinct

Root 1 = 2.0

Root 2 = 2.0

enter coefficients a, b, c

1

1

1

Roots are imaginary

Root 1 = -0.5 + 0.8660254037844386 i

Root 2 = -0.5 + 0.8660254037844386 i

Enter coefficient a, b, c

4

12

9

Roots are real and equal

Root 1 = -1.5

Root 2 = -1.5

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